

INTEGRATED CIRCUIT DEVICES WITH METAL-INSULATOR-METAL CAPACITORS AND METHODS OF FORMING THE SAME

ABSTRACT OF THE DISCLOSURE

A conductive contact plug extends through an opening in the dielectric layer to contact the substrate and includes a widened pad portion extending onto the dielectric layer adjacent the opening. An ohmic pattern is disposed on the pad portion of the plug, and a barrier pattern is disposed on the ohmic pattern. A concave first capacitor electrode is disposed on the barrier pattern and defines a cavity opening away from the substrate. A capacitor dielectric layer conforms to a surface of the first capacitor electrode and a second capacitor electrode is disposed on the capacitor dielectric layer opposite the first capacitor electrode. Sidewalls of the ohmic pattern, the barrier pattern and the pad portion of the contact plug may be substantially coplanar, and the device may further include an etch stopper layer conforming to at least sidewalls of the ohmic pattern, the barrier pattern and the pad portion of the contact plug. Related fabrication methods are described.